

Urinary retention in women: what a general urologist should know

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Urinary retention (UR) is classified by the International Continence Society (ICS) into acute (AUR) and chronic (CUR). AUR is defined as the “inability to pass any urine despite having a full bladder which is painfully distended and readily palpable or percussible on examination” while CUR is painless with chronic high postvoid residual urine (PVR) [1,2].

For decades, urinary retention has been a well-recognised and well-documented problem in men. However, symptomatic urinary retention is often underdiagnosed in women and this has led to a paucity in epidemiological data and the incidences are not well documented in literature. The reported annual incidence of acute urinary retention in females is 7 per 100,000 people, with a male to female ratio of 13:1 [3].

Several causes have been identified for female urinary retention. They can be categorised into four main categories: obstructive, neurological, functional and pharmacological [4,5]. The most common causes of UR are summarised in Table 1.

Diagnosis and initial management (Figure 1)

History taking

A comprehensive history is essential to differentiate between AUR and CUR. Focused sexual, bowel, drug, medical, surgical and neurological history is also very important to detect the primary cause of urinary retention and to direct the management plan.

Diagnosis of AUR in women is confirmed by the presence of a high post void residual (PVR) recording either by ultrasound scanning (USS) or bladder scanner when the patient presents with the complaint of an inability to pass urine along with suprapubic pain. Women with CUR are usually diagnosed with incidentally

discovered high PVR on USS without suprapubic pain. They can also present with a long history of lower urinary tract symptoms (LUTS), overflow urinary incontinence (full bladder with nocturnal enuresis / daytime urinary incontinence) or recurrent urinary tract infections (rUTIs) [6,7].

Examination

Following history taking, thorough general, abdominal, pelvic, rectal and neurological examinations are of paramount importance in establishing the predisposing factors and possible underlying cause of UR (Table 1).

Catheterisation

Indwelling urethral catheterisation (IDC) is the initial management option in the case of AUR. However, in CUR, either an IDC or clean intermittent self-catheterisation (CISC) can be offered depending on renal functions, inflammatory markers and patient’s comfort. CISC is always a preferred option to manage UR in females, provided there are normal renal functions, adequate hand function and patient’s desire.

Catheter insertion can be challenging in some female patients due to vaginal atrophy, labial adhesions and / or retraction of urethral meatus, morbid obesity, urethral abnormalities (stenosis or tumours) or vaginal pathologies. In these cases, careful positioning, good lighting and assistance, and use of rigid or curved-tip catheters can be very useful.

Laboratory investigations

Renal function (serum creatinine and estimated glomerular filtration rate [GFR]) and electrolytes to assess upper tract

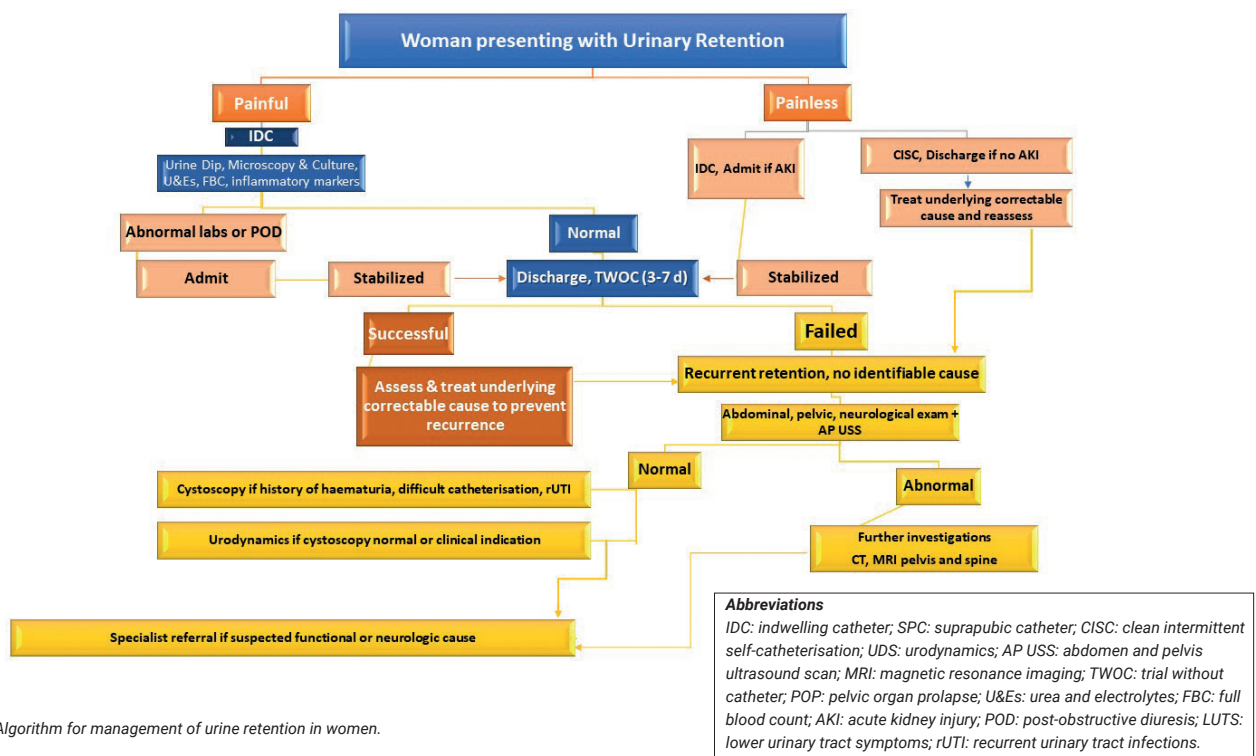


Figure 1: Algorithm for management of urine retention in women.

Table 1: Causes of urinary retention in females.

Obstructive	<ul style="list-style-type: none"> • Pelvic organ prolapse, mal-positioned pessary • Constipation, pelvic masses, pregnancy • Radiotherapy • Instrumental or prolonged delivery • Bladder, urethral stones • Bladder neck stenosis or reconstruction • Colpo-suspension, urethral slings or bulking agents • Artificial urinary sphincter • Urethral cancer, diverticulum or thrombosed caruncle • Genital herpes or lichen planus • Vaginal oedema secondary to infections or surgeries • Vaginal or vulval masses • Postoperative vaginal packing • Urethral stenosis secondary to infections, external trauma, iatrogenic injury or scarring.
Neurological	<ul style="list-style-type: none"> • Detrusor sphincter dyssynergia • Detrusor acontractility or underactivity • Iatrogenic / surgical nerve injury • Multiple sclerosis, transverse myelitis • Multisystem atrophy or Parkinson’s disease • Cauda equina syndrome • Cerebral palsy • Spinal dysraphism or spinal cord infarction / demyelination • Epidural abscess or metastasis • Guillain-Barre syndrome • Neuropathy e.g., diabetes mellitus • Stroke • Spinal cord injury, disc prolapse.
Functional	<ul style="list-style-type: none"> • Fowler’s syndrome • High tone non-relaxing urethral sphincter.
Pharmacological	<ul style="list-style-type: none"> • Antipsychotics, tricyclic antidepressants • Selective serotonin reuptake inhibitors • Antihistamines, anticholinergics, antispasmodics • Opioids • Alpha-adrenergic agonists • Intra-detrusor botulinum toxin.

function should be requested for all patients. Following initial bladder emptying, urine analysis and, if indicated, urine for culture and sensitivity should be sent to exclude UTI.

Indications of hospital admission

It is important that all healthcare professionals must consider the factors that mandate hospital admission for patients presenting with urinary retention. These include: urosepsis, acute kidney injury (AKI) or post-obstructive diuresis. After admission, these patients require careful monitoring of vital signs, urine output, body weight, renal function and electrolytes in order to avoid any electrolyte imbalance or deterioration of the general condition of the patient [8].

On discharge, re-evaluation should be done before planning trial without a catheter (TWOC) and certainly after addressing the underlying cause. Special attention should be paid when acute kidney injury (AKI) is present on admission as it could be due to anatomical or functional bladder outlet obstruction (BOO) that should be managed before TWOC (see section on further management).

If admission is not indicated, the patient can be discharged with a catheter, and a TWOC can be arranged in a few days. Reversible causes, like medications, constipation, postoperative pain and UTI should be treated before planning the TWOC. There is no consensus about the duration at which TWOC should be organised, however the literature reports duration ranging from three days to a few weeks [4]. In the authors’ view, whenever possible, early TWOC is always preferred to prevent iatrogenic urethral trauma and other catheter related complications.

In cases of recurrent urinary retention, it is important that the treating clinician should ensure that all important aspects of history and examination have been explored to manage any reversible cause before requesting any further investigations.

Investigations for recurrent urinary retention

Ultrasound scan

Abdominal and pelvic USS is the first imaging modality that should be requested to assess upper urinary tract and exclude any pelvic pathology. In the absence of any abnormality, there is no need for further imaging studies. However, one should be conscious of USS’s limitations as it is an operator-dependent study. It is advisable to request additional imaging studies in the event of uncertain findings.

CT or MRI

These are requested only in selected groups of patients. CT / MRI can help to detect upper and lower urinary tract, urethral, bowel, gynaecological or retroperitoneal pathologies as the underlying cause of urinary retention. MRI brain or spine must be requested if a neurologic cause is suspected, such as multiple sclerosis (MS), cauda equina syndrome (CES), etc.

Flexible cystoscopy

Although used commonly in the diagnostic pathway of UR in females, it is not routinely indicated unless suggested by clinical history or other investigations. Typically, if urethral catheterisation is straightforward, flexible cystoscopy is unlikely to show any

obstruction that could have resulted in urinary retention. In the case of difficult catheterisation, it can add diagnostic value by identifying the cause of bladder neck or urethral obstruction as listed in Table 1.

Flexible cystoscopy is indicated in patients with any red flag signs such as haematuria, suprapubic pain, recurrent UTIs, etc. and can also be helpful to rule out urethral mesh erosion in cases of previous stress urinary incontinence (SUI) or pelvic organ prolapse (POP) surgeries using synthetic mesh.

Rigid cystoscopy under general or regional anaesthetic is advisable in cases of failed flexible cystoscopy to rule out anatomical versus functional obstruction. If this does not show any anatomical obstruction, urethral dilatation should not be performed and instead, specialist referral to functional urology should be made.

Urodynamic studies (UDS)

Urodynamic pressure flow studies should be done only if the result will change the management plan. The main aim is to differentiate between the anatomical and functional obstruction and identify the unsafe high-pressure bladder from safe low pressure bladder [9].

Practically, high voiding pressure (good detrusor contraction) with low / no flow is suggestive for anatomical or functional obstruction, while low detrusor pressure with low / no flow during voiding phase is typically found in cases of detrusor underactivity in patients with diabetes mellitus, CES and other neurological conditions. Video urodynamics is recommended for patients with underlying neurological causes.

Absence of general agreement on the use of bladder indices in women, like bladder outlet obstruction index (BOOI) and bladder contractility index (BCI) used in men, makes the diagnosis challenging in this type of patient [10]. Therefore, it should be preceded by detailed history, physical examination and if indicated, flexible cystoscopy to exclude obvious causes of anatomical obstruction.

A normal cystoscopy in combination with high detrusor pressure on voiding with low / no flow leads to the diagnosis of a functional obstruction (such as Fowler's syndrome or high tone non-relaxing sphincter) and mandates specialist referral.

Sphincter electromyogram (EMG) is the gold standard test to diagnose Fowler's syndrome. However, it is painful and requires specialist equipment and expertise and hence not routinely offered. The diagnosis is made based on clinical history, UDS findings and exclusion of other causes. Most women with this condition are in their 20–30s and present with large volume urinary retention causing abdominal discomfort. They may also have a history of polycystic ovarian syndrome and can present with a spontaneous episode or following an operative procedure (gynaecological, urological, colorectal, etc.) or after childbirth.

Further management

Long-term management of recurrent urine retention is directed toward treating the predisposing aetiology. To follow is a summary of the most common causes and options of management.

Anatomical obstruction

Some causes such as constipation need medical treatment or manual evacuation while surgical intervention may be required in cases of POP, para-urethral lesions, urethral diverticulum, vaginal mesh exposure, gynaecological, pelvic and retroperitoneal tumours. CISC or indwelling catheter can be offered until the completion of the course of treatment and then reassessment will be required.

Urethral stenosis

This is treated by urethral dilation under anaesthesia followed by intermittent self-dilatation. Recurrent urethral stenosis can be managed by repeating the dilatation or specialist referral can be made to explore the option of urethroplasty.

Urinary retention in pregnancy

Although with the risk of preterm labour and recurrent UTIs, IDC may be the only practical way of treatment in cases of urine retention in pregnancy especially in the last trimester due to difficulty in accessing the urethra for CISC. However, CISC is still preferable whenever possible. Reassessment should be made after the delivery.

Pharmacologic causes

Medications that are suspected to cause urinary retention should be discontinued if possible and assessment should be made to see if this restores the normal bladder function.

Neurological and functional causes

These cases need specialist referral as the management is done in specialised centres through a multidisciplinary team (MDT) approach with functional urologists, neurologists, neurosurgeons, colorectal surgeons, physiotherapists, and specialist nurses. The choice of treatment option depends on the patient condition, comorbidities, hand function, patient choice and local facilities. For example:

- Neurogenic bladder secondary to MS, diabetic cystopathy, CES, disc prolapse, spinal cord injury (SCI), transverse myelitis (TM): CISC is the preferred option however, if associated with poor hand function, suprapubic catheterisation (SPC) or IDC will be the long-term treatment options.
- Fowler's syndrome: With a success rate approaching 70%, sacral neuromodulation (SNM) is a well-recognised management option for these patients [11]. If it is unsuccessful or the patient is not fit or not keen on SNM, long-term treatment by alternate methods of urine diversion should be discussed. Injection of onabotulinumtoxinA (Botox®) to the urethral sphincter can also be considered in selected patients after the MDT discussion [12]. CISC in these patients is often painful and not well tolerated.
- Detrusor sphincter dyssynergia (DSD): CISC is the mainstay of treatment. IDC and SPC are the other alternative options. Intra-sphincteric Botox injection has also been tried with varying results in this group [13].

General concepts for catheterisation and urinary diversion

CISC has the advantage of reducing long term complications of indwelling catheters, like recurrent UTI, chronic pain / spasms and risk of bladder cancer. Number of catheterisations per day differs from one condition to another and depends on the ability of bladder emptying and amount of PVR [4]. However, if CISC is difficult (such as in frail and dementia patients or those with poor hand function), unsafe or not preferred by the patient, long term SPC or IDC can be offered after adequate counselling about the risks and benefits.

SPC is relatively safe with less complications than IDC especially in the context of iatrogenic urethral trauma, however there is a small but possible risk of bowel and vascular injury that can result in significant morbidity and mortality ($\leq 2\%$) [14].

Major surgical intervention in the form of urinary diversion (Mitrofanoff's procedure or ileal conduit) should be offered as a last resort after careful consideration and discussion at the MDT.

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TAKE HOME MESSAGES

- Urinary retention is relatively uncommon but often underdiagnosed in women.
- Detailed clinical history and thorough examination is crucial to make a correct diagnosis and identify the underlying cause.
- CISC is preferred over indwelling urethral catheter whenever possible and clinically appropriate.
- Recurrent urinary retention warrants detailed assessment to identify any modifiable cause before organising specialised investigations and onward specialist referral.
- Urodynamics and flexible cystoscopy are useful adjuncts in the diagnostic pathway and should be offered if the outcome will change the management plan.
- There is no role for urethral dilatation in the presence of a normal cystoscopy.
- Specialist referral is indicated if there is no identifiable cause of urinary retention and in patients with suspected functional or neurologic causes.

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